

NOTES ON THE DIRECTION OF THE HAIR ON THE BACK OF SOME KANGAROOS.

By N. DE MIKLOUHO-MACLAY.

[PLATE LXXI.]

The peculiarity in the direction of the hair on the neck of *Dorcopsis Mulleri* (1), *Dendrolagus ursinus* and *Dendrolagus inustus*, has been described and figured already by Schlegel and Müller (2) over forty years ago.

(1). The *Dorcopsis Brunii* of S. Müller, or the *Macropus Mulleri* of Prof. Schlegel, is after Prof. Garrod, "generically distinct from *Macropus* in its widest sence, and from all its minor divisions, it is also evident that *Dorcopsis Mulleri* must be the name applied to the *Dorcopsis Brunii* of Müller." (Proceed. of the Zool. Soc., 1875. p. 49)

(2). Herm. Schlegel and Sal. Müller. *Over drie Buideldieren uit de familie der Kengoeroes.* (Pl. XIX-XXIV, published as a part of the: "*Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche overzeesche Bezittingen door de Leden der Naturkundige Commissie en andere Schrijvers uitgegeven op last van den Koning door C. T. Temminck.* 1839-1844.

Over the direction of the hair of the body of *Dorcopsis Mulleri*, the authors say:—

"De vleug der haren neemt op verscheidene plaatsen van het ligchaam "eene besondere rigting aan. De haren des staarts namelijk loopen, langs de "boven-en onderlijn naar achteren; die der zijden daarentegen zijn naar "boven gerigt, en op de eerste helft van de lengte des staarts zijn deze haren "in het midden, als het ware gescheiden, door dat de bovenste opwaarts, de "onderste benedenwaarts gerigt zijn. Boven, langs het midden de schouders, "vormen de haren eene scheiding, doordien zij van daar naar voren op den "nek, en van de zijden naar beneden op de armen loopen, en alzoo van de "regt naar achteren loopende haren van den rug afgescheiden zijn. De haren "van de zijden des kops loopen naar beneden, maar die van de bovenste "vlakke zijn naar achteren gerigt, stooten op het midden der kruin aan "elkander, en vormen eene sort van kam, welke zich teganover het achterste "einde der ooren, op de nek, in de naar boven en voren gerigte haren der "achterzijde van den hals verliest. . . . (Loc. Cit. p. 135.)

About *Dendrolagus ursinus* the same authors remark:—

" Boven op den rug, achter de schouders, vormt het hair eene "soort von kring, van waar het naar alle kanten, als wit een middelpunt,

Prof. Garrod, redescribing the *Halmaturus luctuosus* of D'Alberty as *Dorcopsis luctuosa*, which shows the same peculiarity, says:—"All the hair covering the space bounded in front by a line running transversely across the parietal region, and behind by two lines joining in the middle line between the shoulders, to form a right angle seven inches behind the occiput, and extending forward and outward to the shoulder-joint, being directed forward, whilst the general body-covering of hair is directed normally backwards." (1.)

Dorcopsis Chalmersii, described by me in a former paper (2), shows on the neck exactly the same extent of fur, with the hair directed forward, as in *Dorcopsis luctuosa*. The direction of the hair on the tail of *Dorcopsis Muellieri*, mentioned by Schlegel and Müller, does not exist in *Dorcopsis luctuosa* nor in *Dorcopsis Chalmersii*.

The peculiarity in the direction of the hair on the neck of the above mentioned kangaroos is still more remarkable in a new species of *Dendrolagus*, discovered lately on the South Coast of New Guinea. In this species—*Dendrolagus Dorianus*—not only the hair on the neck, out nearly the whole of the hair on the back is directed forward. Mr. E. P. Ramsay, in the description of this species, says:—"The whole of the hair on the body is reversed,

straalvormig heenloopt. Het is om deze reden, dat het hair der achterdeelen van den hals naar voren loopt, en tusschen de ooren, aan het naar achteren gerigte, korte hair des kops stootende, hier eene sort van kam vormt, welke zich dwars over het achterhoofd, van het eene ovo tot het andere uitstrekt.
" . . . i . . . (Loc. Cit. p. 142.)

About *Dendrolagus inustus*, we find the following remarks:—

"Het hair, hetwelk van den hairkring boven de schouders, langs den achterhals naar voren loopt, blijft die rigting tot op het midden van den kop behouden, en stoot hier aan het naar achteren gerigte hair der snuits, aldus op den bovenkop eene lijn vormende, welke zich, in eene half cirkelvormige bogt, tot aan de de boven-voorhoek van het oor uitstrekt. (Loc. Cit. p. 144.) On the plates 19, 20 and 21 (of the above mentioned paper of H. Schlegel and S. Muller) the direction of the hair on the neck is distinctly to be seen.

(1.) A. H. Garrod. On the Kangaroo called *Halmaturus luctuosus*, by D'Alberty, and its affinities. Proceed. of the Zool. Soc. 1875. P. 51.

(2.) N. de M. MacLay. On a new species of Kangaroo from the S.E. end of New Guinea. Proceed. of the Linnean Soc. of N.S.W. Vol. IX. P. 569.

and meeting that of the head, which is directed backward, forms a ridge between the ears and down the sides of the cheeks, and is similarly directed on the limbs, the hair on the legs and arms being directed forward, as is usual." (1)

Having had the opportunity, through the kindness of Mr. Wm. Macleay, of closely examining in his museum three specimens of *Dendrolagus Dorianus* (adult ♂ and ♀ and a young ♂) (2), it appears to me that some additional remarks about this most interesting animal to the description of Mr. Ramsay will not be out of place.

The principal external peculiarity of the same is, without doubt, the remarkable direction of the hair on its back, a fair idea of which may be gained by the inspection of fig. 2 (pl. 71), representing *Dendrolagus Dorianus* in profile, with the direction of the hair marked with small darts. The converging point (marked with * on fig. 2), of the lines forming the boundary of the hair directed forward and the hair directed backward, is situated in the middle line, near the base of the tail (565 mm., or about 21.1 in. behind this occiput). From this point the lines run forward and outward (the animal examined in the position represented on fig. 2) to the sides of the knee-joints. From this dividing line the hair of the back is directed forward, while on the sides of the body the direction of the hair is gradually bending towards the ventral middle line. The hair of the head directed normally backward in meeting the hair of the neck (directed forwards) forms between the ears a hair-ridge, which is less marked than in *Dorcopsis*, which extends from the ears to the front along the lower edge of the under-jaw. On the ventral surface of the neck, beginning a little above the episternum, the hair is directed upwards, whilst two narrow bands, with the hair

(1.) *E. P. Ramsay*. Contributions to the Zoology of New Guinea. Part VII. Proceed. of the Linnean Soc. of N.S.W. Vol. VIII. 1883. P. 17,

(2.) They are the same specimens which have served Mr. E. P. Ramsay for his description of the species—*Dendrolagus Dorianus*—and so far as I know, the *only* specimens of this species brought, until now, from New Guinea.

turned downwards, run on both sides of the median portion of the chest. The hair on the arms and legs is directed normally downwards. From the dividing line the hair on the hindparts of the body as well as of the tail is as usual directed backwards.

The direction of the hair on the back in the female of *Dendrolagus Dorianus* is exactly the same as in the male (1), and can very distinctly be observed in the young one (2).

Besides the peculiar direction of the hair on the back, which as we have seen, is not to be found in such an extent in the other species of the genus (3), the dentition of *D. Dorianus* shows a very marked differential character, which does not appear in the other two species. I mean the large size and shape of the central incisors (fig. 3), which are in these respects very different in comparison with those of *D. ursinus* and *D. inustus* (4). Although, as Mr. Ramsay, in his paper about *D. Dorianus*, rightly observes, the teeth of the specimens described by him are in "a very bad state, being corroded by the liquid in which the skin was preserved" (5), it seems to me, that the incisors have not suffered much. The length of the central incisors of the male (in the present state), is not less than 13 mm., or about $\frac{1}{2}$ of an inch. Their external surface is rounded, while the internal flat, worn down. Examined from the front (fig. 4) the space between the central incisors on their base is about 2 mm. (or about $\frac{1}{12}$ in.), but they touch each other on their lower margin which is not pointed, but presents a half rounded cutting edge.

(1). The only sexual differences which I found in the pair of *D. Dorianus* of the Macleay Museum, were: the smaller size of the female (the total length of the ♂, from tip of nose to end of tail, being 1340 mm., or 52.2 in., tail 560 mm., or 22.1 in.; total length of the ♀ 1320 mm., or 51.4 in., tail 550 mm., or 21.7 in.) and the hair of the end portion of the tail of the female being longer.

(2). The total length of the young ♂ (from tip of nose to end of tail 665 mm., or 22.3 in., tail 270 mm., or 10.7 in.)

(3). Speaking in this paper about the "other" species of the genus *Dendrolagus*, I refer only to *D. ursinus* and *D. inustus*.

(4). *Schlegel and Müller*. Loc. cit., pl. 23, figs. 2 and 5.

(5). *E. P. Ramsay*. Loc. cit., foot note to p. 17. The *D. Dorianus* skins have been preserved, as I have been told by Mr. Ramsay, in common salt, called "brine."

The canines in *D. Dorianus* are very large in comparison with those of the other species of the genus; their breadth on the cingulum is nearly 4 mm. (or not quite 0, 2 in), but their length has been most likely reduced in this specimen by the effect of the mode of preservation. —

I am unable to my regret, to add an account about the other teeth of *D. Dorianus*, because they are not accessible for inspection in a stuffed specimen.

In a former paper (1) I have already mentioned that in *Osphranter rufus* the same peculiarity of the direction of the hair of the neck is to be found as in the Genera *Dorcopsis* and *Dendrolagus*. At the time when I wrote the above paper, the only specimen of *Osphranter rufus* showing the peculiarity was the specimen in the Macleay-Museum; but since then, Mr. Ramsay informed me, that another specimen of *O. rufus*, brought alive from the Riverina district and presented lately to the Australian Museum, shows distinctly the same peculiarity as the specimen of the Macleay-Museum.

Two more specimens of *O. rufus* of the same kind have been found amongst the collection of skins in the Australian Museum, so that I had now four skins for my inspection (2). The two old

(1). *N. de Miklouho-Maclay*. On a new species of Kangaroo, *Dorcopsis Chalmersii*, from the south-east end of New-Guinea. Proceed. of the Linnean Soc. of N.S.W., Vol. IX., p. 569.

(2.) Some measurements of the four specimens of

	OSPHRANTER RUFUS, DEMAREST.	From tip of nose— end of tail.		Length of tail.		From occiput to converging point on the back	
		Mm.	F. in.	Mm.	F. in.	Mm.	F. in.
♂ from the Murrumbidgee R. (Mcl. Mus.)	2515	or about	8 3	992	3 3	457	1 6
♂ from the Lachlan R. (Austr. Mus.)	2065		6 9,3	850	2 9,4	290	11,4
♂ from the Riverina distr. (Austr. Mus.)	1630		5 4,2	740	2 5,1	490	1 7,3
♀ also from Riverina (Austr. Mus.)	1800		5 10,9	690	3 3,1	310	1 0,2

males are of a decided rufus colour, while the young male and the female are grey. The young male is especially interesting—showing the converging point, not between the shoulder, but much lower down on the back than in the other three specimens. Having inspected the four specimens, I came to the conclusion, that in *O. rufus* (as well as in the genera—*Dorcopsis* and *Dentrolagus*) the peculiar direction of the hair on the back is not a character of sex or age, and, secondly, that the extent of fur with the hair directed forward, is *not* strictly the same in different specimens. The anterior boundaries of this part of the fur in *O. rufus* differs also from those of the genus *Dorcopsis*. The hair-ridges on the head (between the ears) and the other running down from the ears on the sides of the neck, which both are very marked in *Dorcopsis*, are absent in *O. rufus*. (Compare fig. 5 and fig. 6.)

As regards the non-occurrence of the described peculiarity in the greater number of specimens of *O. rufus*, I think the same could be explained by the supposition of the existence of *two* different varieties of *O. rufus*. (1.)

The reasons *why* it appeared to me not without interest to give by description and illustrations a fuller idea about the occurrence of the above mentioned peculiarity in the direction of the hair on the back of some marsupials are : because in the first instance it is, as far as I know, quite an exceptional case in the class of mammals, where, as a rule the hair on the back is always directed downwards (or backwards), and secondly, because this

(1.) Such a possibility is in accordance with the opinion of Mr. K. H. Bennet and Mr. E. P. Ramsay, who think there are two distinct species of the red Kangaroo, on account of different colour of the young ones ; the young of one species being of a *bluish-grey* colour, the other *grey*, tinged with light rufous.

peculiarity contradicts, or at least puts in doubt until further observations, the general validity of the opinion expressed by Wallace (1) and Darwin. (2.)

This opinion was : that *the direction of the hair on the back of mammals is adapted to throw the rain off* (3). As an example of the correlation of the direction of the hair and the rain, the hair on the arms of *Simia satyrus*, observed by Wallace, has been given (4).

Observations of the attitude of the above mentioned marsupials (principally of *Dendrolagus Dorianus*) during rain will be therefore of great interest, and will give a striking evidence in favour, or against the explanation of Wallace or Darwin.

EXPLANATION OF PLATE 71.

Fig. 1.—Upper part of the body of *Dorcopsis luctuosa*, D'Albertis ♂ in profile, showing the peculiar direction of the hair on the neck.

Fig. 2.—*Dendrolagus Dorianus*, Ramsay, ♂ in profile, to show the direction of the hair on the body.

(1). *A. R. Wallace*. Contributions to the theory of natural selections. A series of Essays, 2nd edition, 1871, p. 344.

(2). *Ch. Darwin*. The descent of man, 2nd edition, 1882, p. 151.

(3). *Ch. Darwin*. "The hairy covering of the body forms a natural protection against the severities of climate and particularly *against rain*. That this is the most important function is well shown by the manner in which the hairs are disposed so as to carry off the water, by being invariably directed downward from the most elevated part of the body." Wallace, Loc. cit., p. 344. — "It can hardly be doubted that with most mammals the thickness of the hair on the back and its direction is adapted *to throw off the rain*." Darwin, Loc. cit., p. 151.

(4). "*A. R. Wallace* remarks that the conveyance of the hair towards the elbows on the arms of the Orang may be explained as serving *to throw off the rain*." Darwin, Loc. cit., p. 151.

Fig. 3.—Incisors and canine of *Dendrolagus Dorianus* ♂. Natural size in profile.

Fig. 4.—The central incisors of the same from the front. Natural size.

Fig. 5.—Upper part of the body of *Osphranter rufus*, Demarest, ♂ in profile showing the same peculiarity in the direction of the hair on the neck. Converging point of the dividing lines "between the portions of fur" with the hair differently directed. The darts show the direction of the hair on different parts of the body.

Figs. 1, 2, 5 are sketches made with the help of a camera lucida, from stuffed specimens of the Macleay-Museum.

ON TRIBRACHYOCRINUS CORRUGATUS (F. RATTE.)
Spec. Nov. FROM THE CARBONIFEROUS SAND-
STONE OF NEW SOUTH WALES.

Plate LXVIII.

BY F. RATTE, ENG. ARTS AND MANUF., PARIS.

Professor M'Coy first described in 1847 (*Tibrachyocrinus Clarkei*), for which he created a new genus (1.)

Professor de Koninck later described specimens of this fossil also. (2.)

(1.) Ann. and Mag. of Nat. Hist. Vol. XX., p. 228. Pl. XII., fig. 2.

(2.) Fossiles Paléozoïques de la Nouvelle Galles du Sud," 1877, part the third, p. 161, pl. 6, fig. 5.